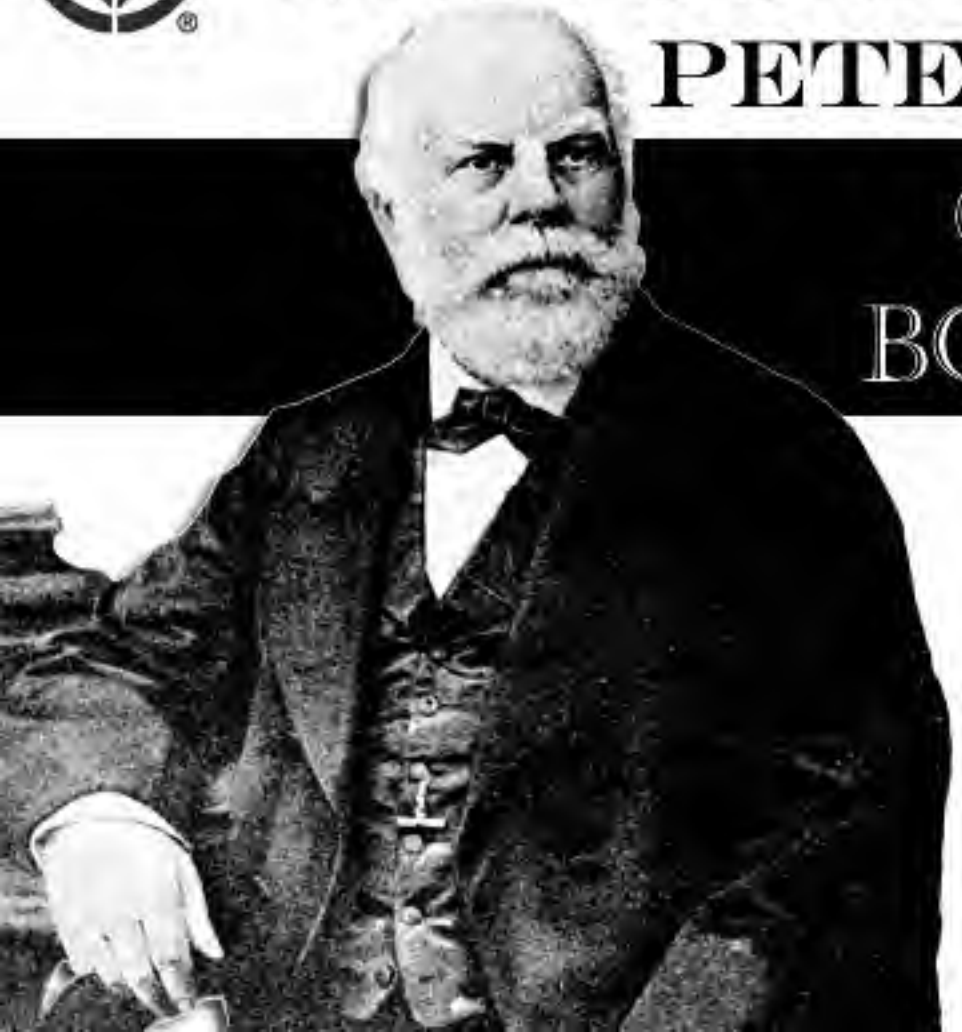
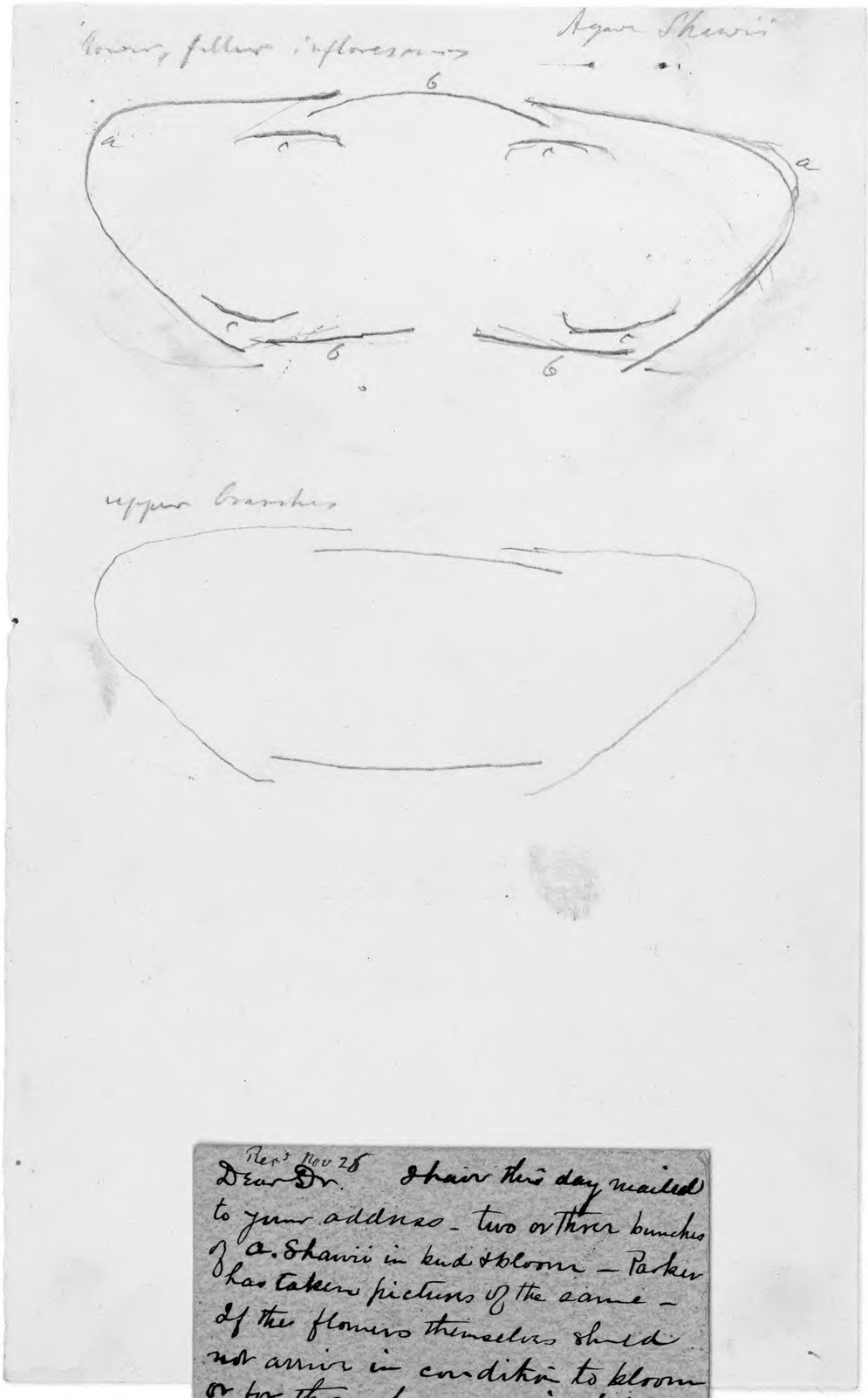
# Missouri Botanical Garden
## Peter H. Raven Library



# George Engelmann Botanical Notebooks

*Pagination Note:*
*Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.*



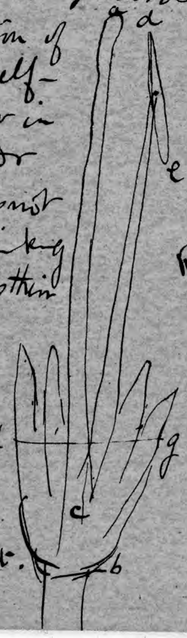

Rec'd Nov 28

Dear Dr. I have this day mailed to your address - two or three bunches of A. Shavii in bud & bloom - Parker has taken pictures of the same - If the flowers themselves should not arrive in condition to bloom or for thorough examination you will be able to get all the facts from the photos -

also a section of the stalk itself - They are now in bloom, so Dr Palmer was not correct in thinking that Feb. was the month.

Our Lyceum would be much advantaged by a copy of the Boundary Rept.

San Diego Nov 15. 75




Respectfully yours

Wm. H. Hitchcock

Cor. Sec Lyceum

8158

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0 1 2 3 4 5 6 7 8 9 10
cm
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Rec. June 21st
Ans. June 23

Neu-Braunfels, 17. Juni 1878.

Lieber Doctor!

Deinen Brief vom 11. d. M. habe ich vorgestern erhalten und beeile mich Dir die verlangte Auskunft über die hier bekannte Agave zu geben. — Zur Erläuterung findest Du die verlangte Skizze der Pflanze, die freilich ziemlich steif gerathen ist, da ich seit mehreren 20 Jahren nicht mehr gezeichnet habe und mir die Lust fehlt durch Wind und Sturm zurückgehalten werde. Die Lust zeichnete die mächtigen Blätter der Pflanze und meine mehr und weniger gut. — Die zwölften Blätter sind etwa 3 Fuß lang, sind zur Zeit ihrer größten Stärke an ihrer dicksten Stelle ein sechszehntel Durchschnitt schwächer 7 Zoll dick. Am Grunde, wo sie einander sind bis auf die Durchschnittsfläche dicke Figur ⊃, in ihrer Mitte dicke Figur ⌣. Wenn die Pflanze anfängt zu blühen, gewinnen die zwölften Blätter die Richtung der Stiele und stehen, wie die Skizze zeigt, und fangen an zu welken. Die abgeblühten, die am Aufang rein weißlich und dorten ins Gelbe und fast in den Farbe variiren, lösen sich nun sowie los, daß sie nämlich am Grunde an Lebenskraft verlieren und abwelken, wie die Figur zeigt. Die nächsten 2 Blattkreise sind grünlich und haben nichts gutes Aussehen. Die blühenden Kreise haben rein grünlich-gelben Färbung und sind weißlich gran Linien und Schrift, daß die Pflanze von weiter Entwicklung ist als ausstellend, daß die Blätter nun zweiziger Form bleiben. Unentwickelte Knospen [illegible] fallen zu Boden (unentwickelte werden nicht gefunden).

Die hier vorkommenden Agave-Arten zweifle 1869 nahe an Gigantea und Montezuma zwischen Venado und St. Louis Potosi gesammelt und hier sorgfältig. Die blühende Pflanze ist also jetzt ungefähr 10 Fuß hoch. Die Blüthenstand (Blüthen, Knospen 1½ Fuß lang) hat die Pflanze gerade [illegible] fallen gelassen.

Als Curiosum sende ich Dir meine Rückkehr nach dem Garten, vorzüglich von Frankfurt a/M vom 9 Mai 1878, wo aber mein Lieblings Agave beschädigt wird, die Blumenblüthen sind [illegible]

8160

Fragaria vesca Agave americana angepflanzt, die neuen Blätter
sprossen 32 Fuß hoch mit 7 Fuß langen Blüthen und
zwei Fuß langen Früchten, in Würzburg, in Augsburg, in
Nürnberg, in Regensburg, in Frankfurt a. M. ano 1726.

Du sagst nichts über Otto Ludwig. Schreibe Du Deine
Ansichten darüber. Es ist, Journal-Artikel nie gelesen
Aufsätze, selbst wo Schwarz Schwarz und Grün
Grün genannt. Die Zeichnungen und Beschreibungen
mag Fremdes falsch sein, gedruckt, als wenn sie
Acht wären, weil sie in der Art nicht nachgeahmt werden,
wie sie von mir gegeben sind, da die Einfachheit
und Einzelheit meiner Darstellung nicht zum
Irrthum Veranlassung geben kann, die Gliederung,
die Verhältnisse der Theile, zu klein und Grün zu
die nie Nebensachen von Wichtigkeit und Genauigkeit
einem Fuß Länge Theilen oft mehr wie
einen Fuß Dicke unter dem Boden fortläuft und nur
die wenigsten Blätter Blüthen und Früchte trägt
Blätter Blüthen und Früchte, die Blüthen
einzeln, die Früchte einzeln, die Blüthen
einzeln, die Früchte einzeln, die Blüthen
einzeln, die Früchte einzeln

Agave Shawii
Engelm & Bigel
Mex. Bound. Surv. 1852

Dem. in 1878

Mex. Bound. Surv. 1852

Tube a little shorter
than Calyx
Filaments
insertion of filaments
slightly above the
middle of Tube
Filaments about
twice as long as the
Perigon above the
Ovary. This
Character of this
style not found
on Agaves

17 mm
32
15 mm
15
8
59
28 mm
22 mm
12 mm



0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

# Henry T. Rohlfing

## APOTHECARY,

*No. 2600 Laclede Ave., S. W. Cor. Jefferson*

ST. LOUIS, MO.

*No.* ..... *Date,* .....

℞

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1918

*Geo. Engelmann, M.*

No. 3003 Lo

0 1 2 3 4 5 6 7 8 9 10
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Agave Schidiana ?
= flower at New Braunfels
= June 1878
was brought 1869 from the
neighborhood of Montezuma
between Venado and
San Luis Potosi
growing & blooming outdoors

Leaves

a

b

a & b Blüthenstände
von Blüthen.

F. Lindheimer fec.

0 1 2 3 4 5 6 7 8 9 10
cm
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8162

Agave Salmiana ?

sm A atrovirens fide Baker

see also Gardeners Chronicle Aug 11 1877
which looks rather different from our cent

[This folder includes
Sheets 122-124].

A. Salmiana

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cm
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Cop of original notes Dr Parry Dec 1879
July 15th 1850

Agave — ?

near Boundary line

= (A. Shawii Engl.)

A stem 8 – 12 ft. girth 8 inches. growing out of the apex of protruded clusters of leaves. tapering towards the middle club-shaped above and below. surface pale green nearly covered by broad triangular bracts inserted obliquely & spirally arranged nodose at base clasping the stem 6 inches long 2 inch broad at attachment  Leaves spathulate acuminate widening at their insertion 10 inches long 4½ wide at widest upper part set with a castellopinous row with horizontal hooked bristles and ending in a short acumination color light green marked with the impression of the hooks of the folding leaves in spawning – margin purplish spines yellowish & white at top – The apex of the spawning leaves prolonging like the axis becomes prostrate

Upper part of stem thickening & the lower flower branches pedunculos horizontally flattened and spreading at right angles with the stem subtended by a large bract: bearing flowers in a close cluster at extremity of peduncles without distinct pedicels – middle fl branches the longest forming round-ish fl fruit with remains of flowers adhering (capsule just as I found in my note book) never seen after. answers pretty well to the photograph!

I find also short notes of Yucca Whipplei in fruit (1850)

In my diary of same date. I note. a gum like gum arabic exuding from fruits of Agave "Shawii.

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cm
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cm
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Journey at Shaws Gardens

Oct^r 31/77

Dr. F. Engelmann

Dear Sir

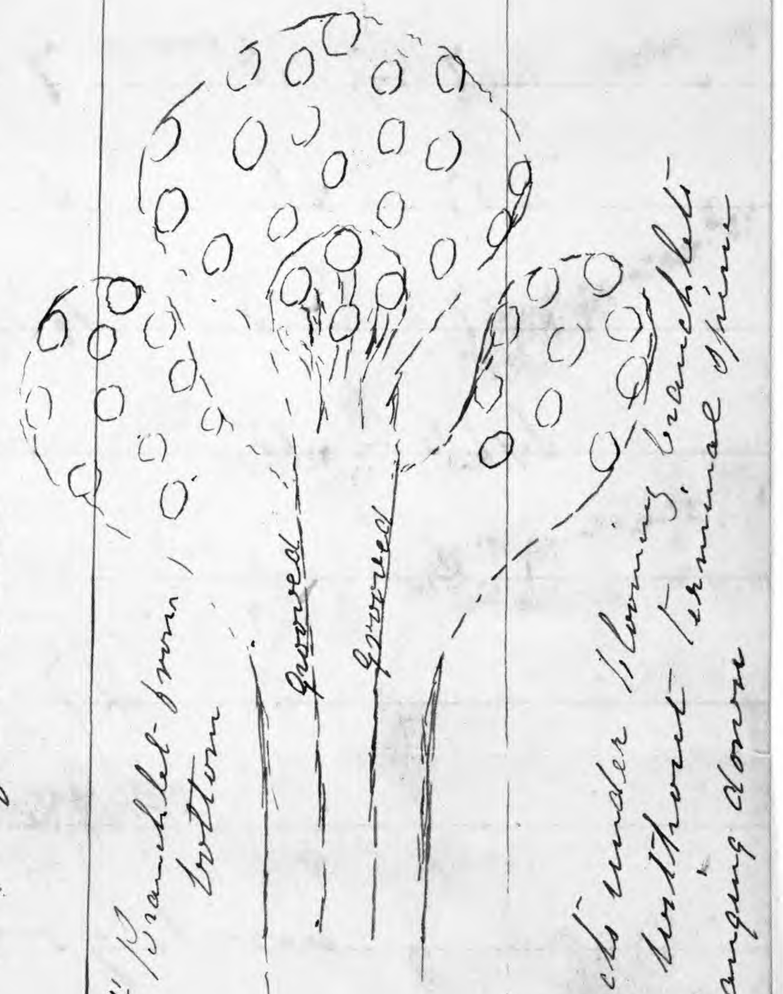
The only Notes I made Concerning Agave Shawii were as follows —

| Date | Growth from Evening to Morning 7 o'clock — in. | From Morning to evening 7 o'clock in | Evening to Morning. | From Evening |
|---|---|---|---|---|
| July 6 | 1/8 | 1/8 | | |
| 9 | 1/8 | 1/8 | | |
| 10 | 1/4 | 1/8 | | |
| 11 | 1/4 | 1/4 | | |
| 12 | 1/4 | 1/8 | | |
| 13 | 1/4 | 1/8 | | |
| 14 | 1/4 | 1/4 | | |
| 15 | 1/2 2/4 | 1/4 | | |
| 16 | 1/4 | 1/4 | | |
| 17 | 1/2 2/4 | 1/4 | | |
| 18 | 11/4 | 7 1/2 / 4 = 1 3/4 | | |
| 19 | 1/4 | 1/8 | | |
| 20 | 1/4 | 1/4 | | |
| 21 | 1/4 | 1/4 | | |
| 22 | 1/4 | 1/4 | | |
| 23 | 1/4 | 1/4 | | |
| 24 | 1/4 | 1/4 | | |
| 25 | 1/2 | 1/4 | | |
| 26 | 1/4 | 1/4 | | |
| 27 | 12/4 = 3 1/2 | 9/4 = 2 1/4 | | |
| 28 | 1/2 | 1/4 | | |
| 29 | 1/2 | 1/4 | | |
| 30 | 1/2 | 1/4 | | |
| 31 | 1/2 | 1/2 | | |
| Aug 1 | 1/2 | 1/2 | | |
| 2 | 1/4 | 1/4 | | |
| 3 | 1/2 | 1/4 | | |
| 4 | 1/2 | 1/4 | | |
| 5 | 1/2 | 1/2 | | |
| 6 | 19/4 = 4 3/4 | 15/4 = 3 3/4 | | |
| 7 | 1/2 | 1/2 | | |
| 8 | 3/4 | 1/2 | | |
| 9 | 3/4 | 3/4 | | |
| 10 | 3/4 | 3/4 | | |
| 11 | 3/4 | 3/4 | | |
| 12 | 3/4 | 3/4 | | |
| 13 | 3/4 | 3/4 | | |
| 14 | 3/4 | 3/4 | | |
| 15 | 3/4 | 3/4 | | |
| 16 | 28/4 = 7 | 18/4 = 4 1/2 | | |
| 17 | 1/2 | 1/2 | | |
| 18 | 1/2 | 1/2 | | |
| 19 | 1/2 | 1/2 | | |
| 20 | 1/2 | 1/2 | | |
| 21 | 1/2 | 1/2 | | |
| 22 | 1/2 | 1/2 | | |
| 23 | 1/2 | 1/2 | | |
| 24 | 1/2 | 1/4 | | |
| 25 | 1/2 | 1/2 | | |
| 26 | 20/4 = 5 | 16/4 = 4 | | |
| 27 | 1/2 | 1/4 | | |
| 28 | 3/4 | 1/4 | | |
| 29 | 1/2 | 1/4 | | |
| 30 | | | 1/2 | 1/4 |
| 31 | | | 1/2 | 1/2 |
| Sept 1 | | | 1/2 | 1/4 |
| 2 | | | 1/2 | 1/4 |
| 3 | | | 1/4 | 1/4 |
| 4 | | | 2 Hours | 1/2 |
| 5 | | | " 19 = 12 | 1/2 |
| 6 | | | 1/2 | 3/4 |
| 8 | | | 1/2 | 3/4 |
| 9 | | | 1/2 | 1/4 |
| 10 | | | 1/2 | 1/2 |
| 11 | | | 1/4 | 1/2 |
| 12 | | | 1/2 | 1/2 |
| 13 | | | 1/2 | 1/2 |
| 14 | | | 1/2 | 1/2 |
| 15 | | | 1/4 | 1/4 = 19 |
| 16 | | | 1/4 | 1/4 |
| 17 | | | 1/4 | 1/4 |
| 18 & 19 | | | 1/4 | 1/4 |
| 20 & 21 | | | 1/4 | 1/4 |
| 22 & 23 | | | 1/3 | 1/3 |
| 24 & 25 | | | 1/4 | 1/4 = 5 1/2 |
| 26 & 27 | | | 1/8 | 1/8 |

Whole day?

Then commenced making the head for bloom which is one foot 8 in long with 17 heads of bloom, Branches varying from

Lowest one 8 in long
3rd — — 11 in "
getting gradually shorter.
The one under terminal head 1 inch long —


Grooved
Grooved
Grooved

8164

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

1952 / 2725 / 1952 / 14 / 775 / 55

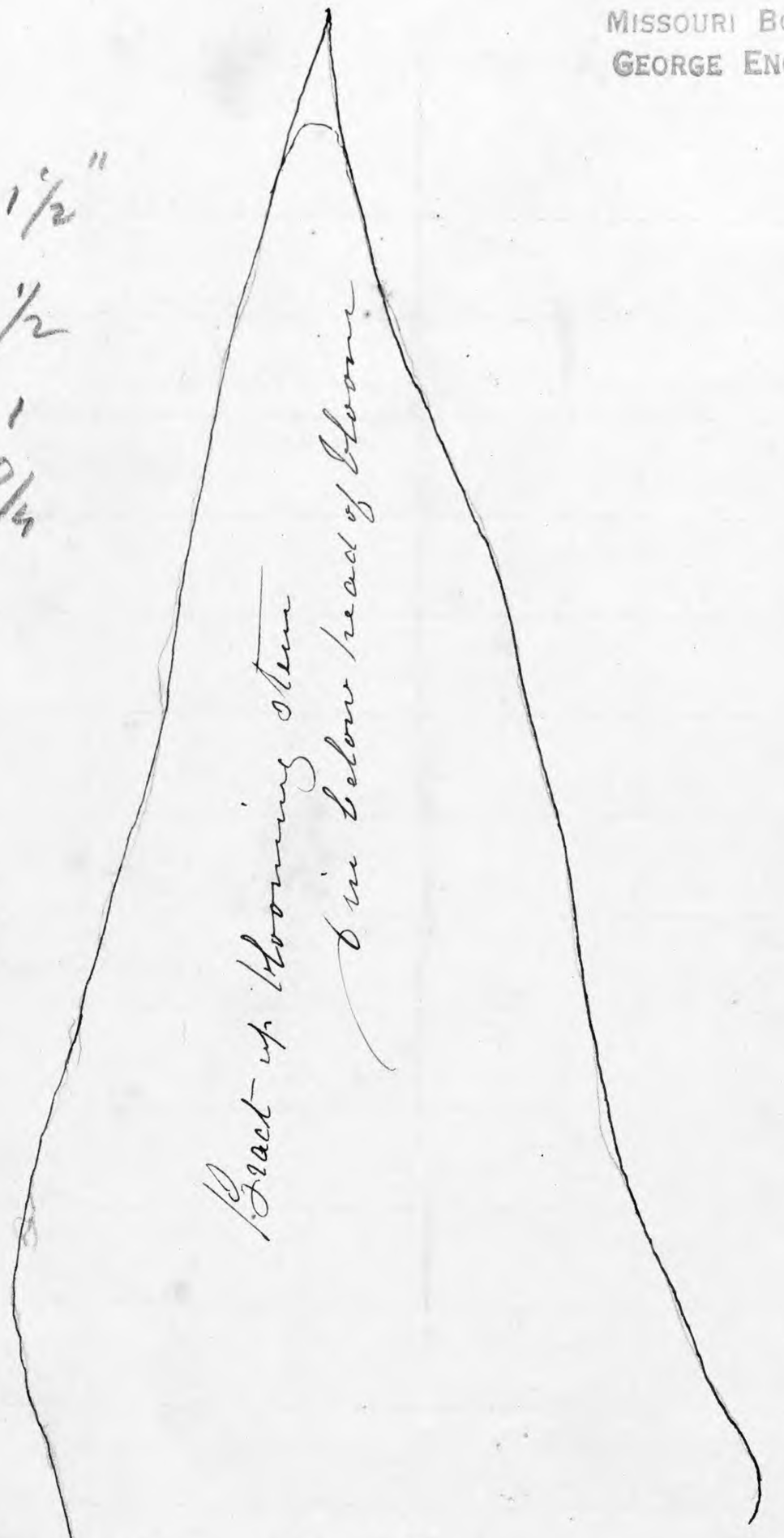
B 10" 78° 1½"

18 84 ½

19 1

23 85 1

24 85 ¼




42. 58

X : 27 = 100 : 46,25

27.25 : 195

46,25
195
20125
41625
4625
901,875

4625 / 19500 / 42
18500
1000

4625 / 272500 / 59
23125
412500
41625

| 1876 | | 7 P.M. – 7 A.M. Night | 7 A.M. – 7 P.M. Day | | mean temp. rain deg. of Fahr. |
|---|---|---|---|---|---|
| 10 days | July 8 – 17 | 2¾ in. | 2 in | total ÷ 10 days 4¾ | 1.26 82.8° |
| " | " 18 – 27 | 3 " | 2¼ | 5¼ | 1.03 77.4 |
| " | " 28 – Aug 6 | 4¾ | 3¾ | 8½ | 0.72 69.1 |
| " | Aug 7 Aug – 16 | 7 | 4½ | 11½ | 1.51 78.3 |
| " | " 17 – 26 | 5 | 4 | 9 | 2,21 79.1 |
| " | " 27 – Sept 5 | 4¾ | 3 | 7¾ | 1.71 72.6 |
| " | Sept 6 – 15 | | | 4¾ | |
| " | " 16 – 25 | | | 1⅜ | |

27¼ + 19½ = 46¾

58 : 42

Largest growth in one Day Aug 10 1½ inches.

Scape 75 inches with panicle — This 21 inches

— to base panicle 54 inches panicle 21 inches

together 75 inches

0 1 2 3 4 5 6 7 8 9 10
cm
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Eleanore trunk of Agave Shawii on Todos los Santos
Bay, Lower California:
Caudex 3 feet high
naked part of rope 7 feet, panicle 3 1/3 feet
with 15 branches; circumference of rope at base
13 inches
in flower and young fruit.

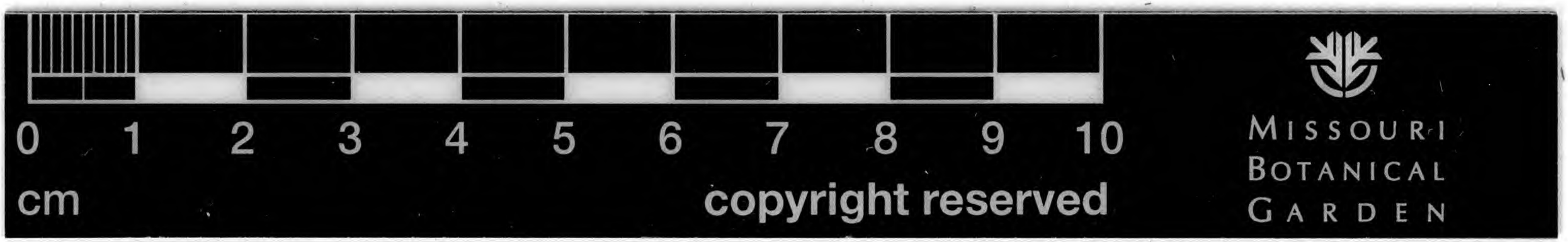
Dr Parry Jan 1883.

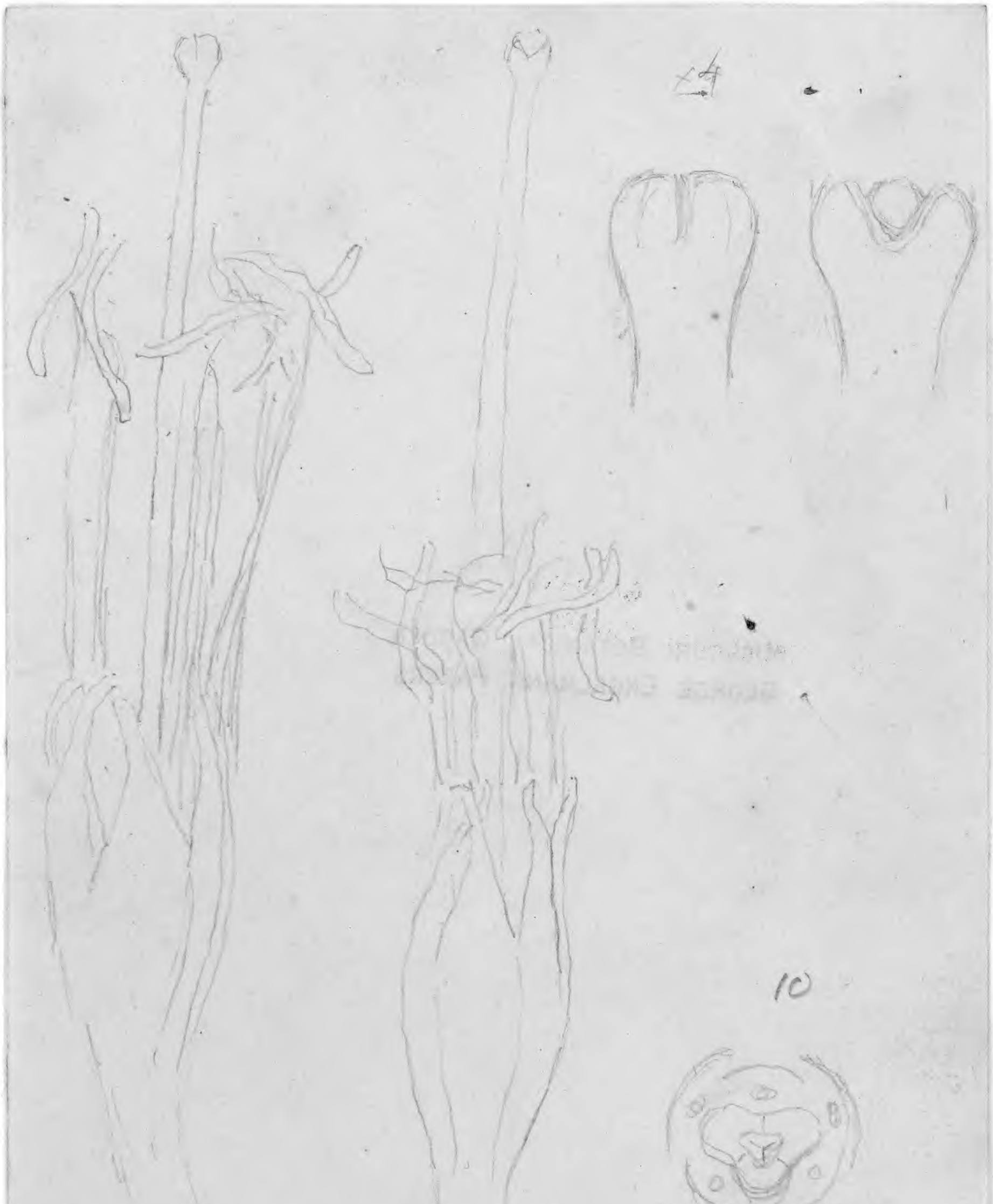
Georg
LI

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cm 0 1 2 3 4 5 6 7 8 9 10

# JNO. S. HEALY,

## DRUGGIST AND CHEMIST,

***S. W. Cor 5th and Myrtle Sts.***

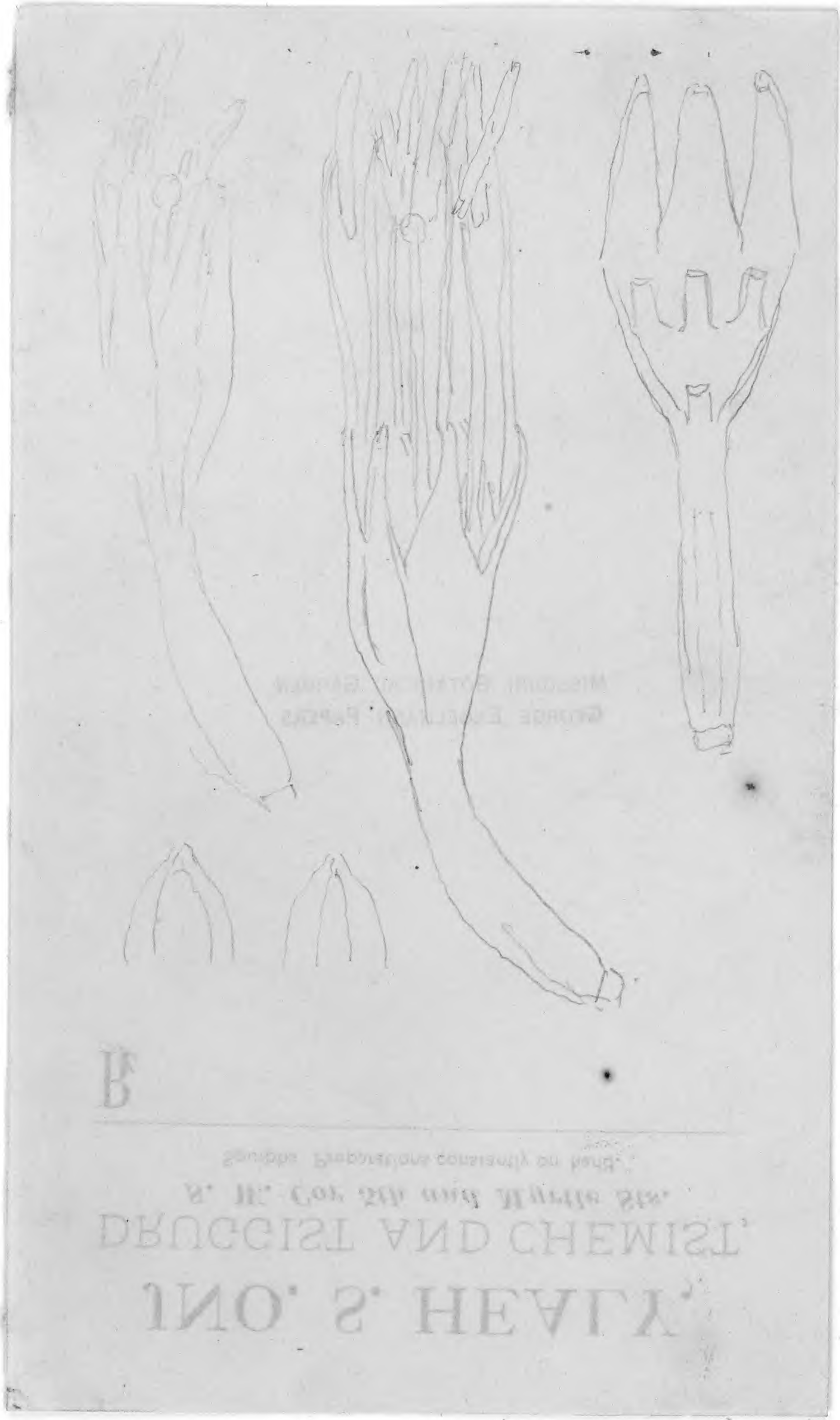
Spuibbs' Preparations constantly on hand.

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℞

Missouri Botanical Garden
George Engelmann Papers

9918



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cm 0 1 2 3 4 5 6 7 8 9 10

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# JNO. S. HEALY,

## DRUGGIST AND CHEMIST,

***S. W. Cor 5th and Myrtle Sts.***

Spuibbs' Preparations constantly on hand.

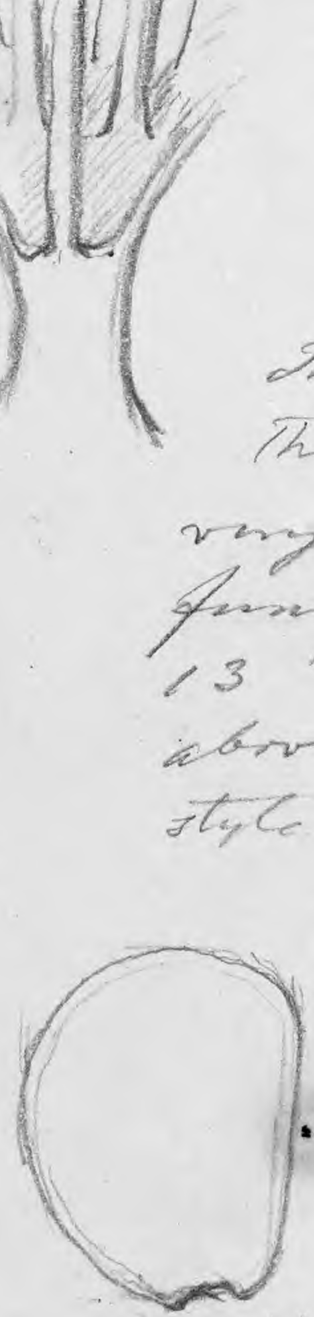
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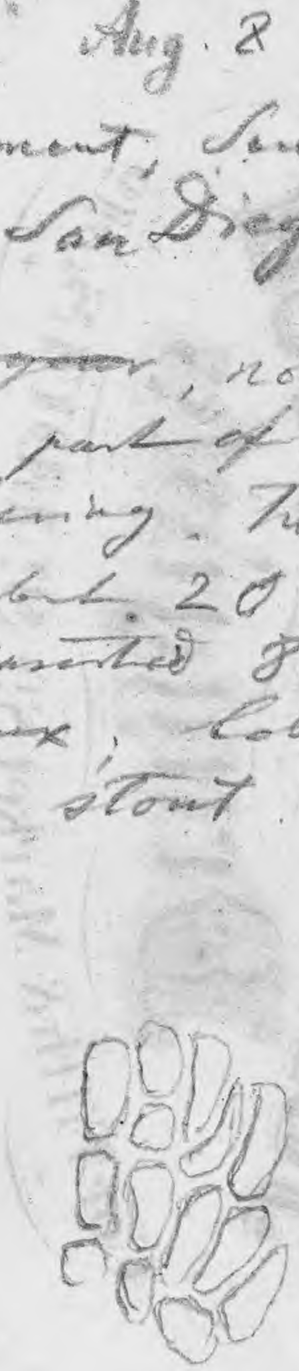
Agave Shawiana Aug. 8 1875
monument, South of
San Diego

Immature fruit ~~of last year~~, not open,
Thick, in some of them part of the
very fleshy flower adhering. Tube
funnel shaped, wide abt. 20 mm;
13 mm long; stamens inserted 8 mm
above base, 5 below fauces, lobes ?
style and filaments very stout



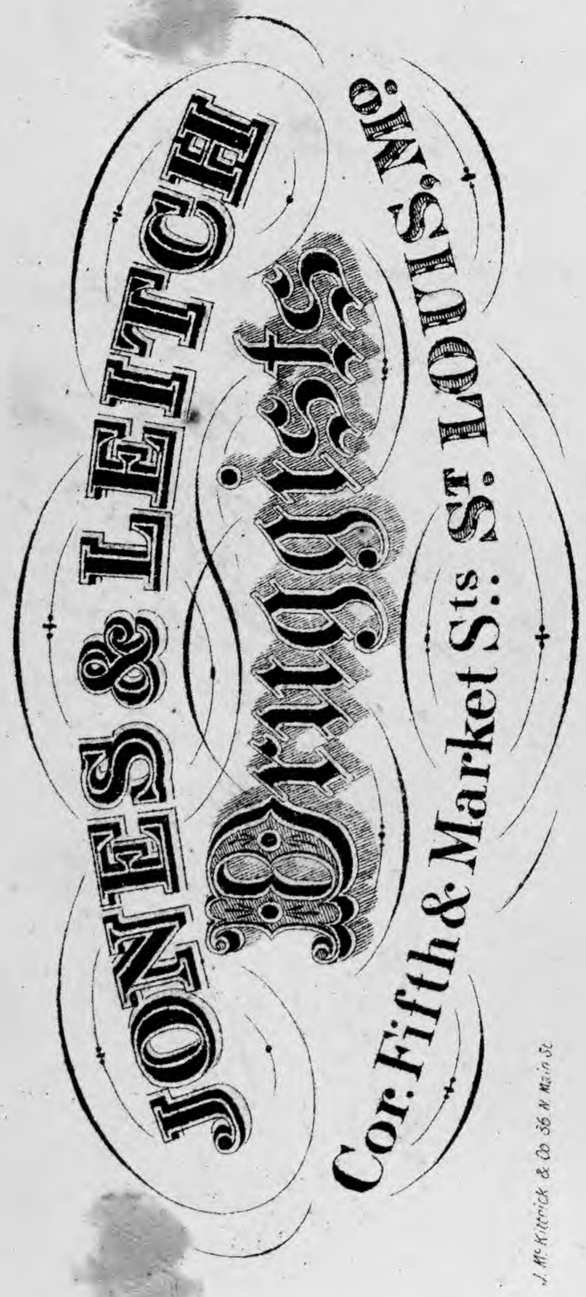




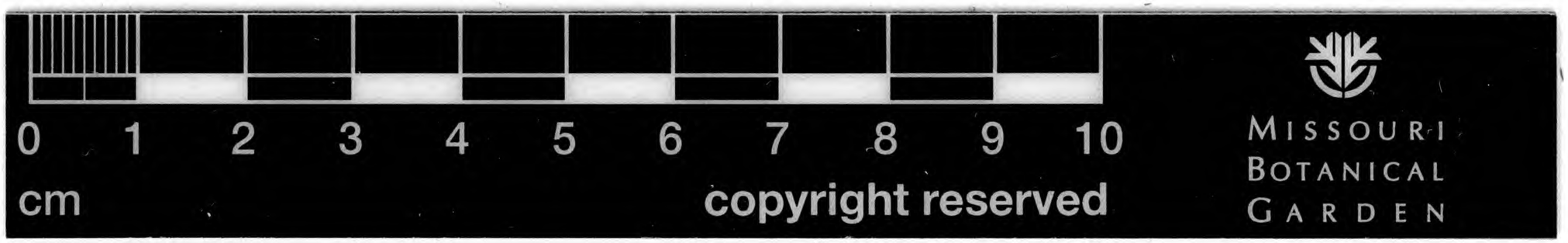




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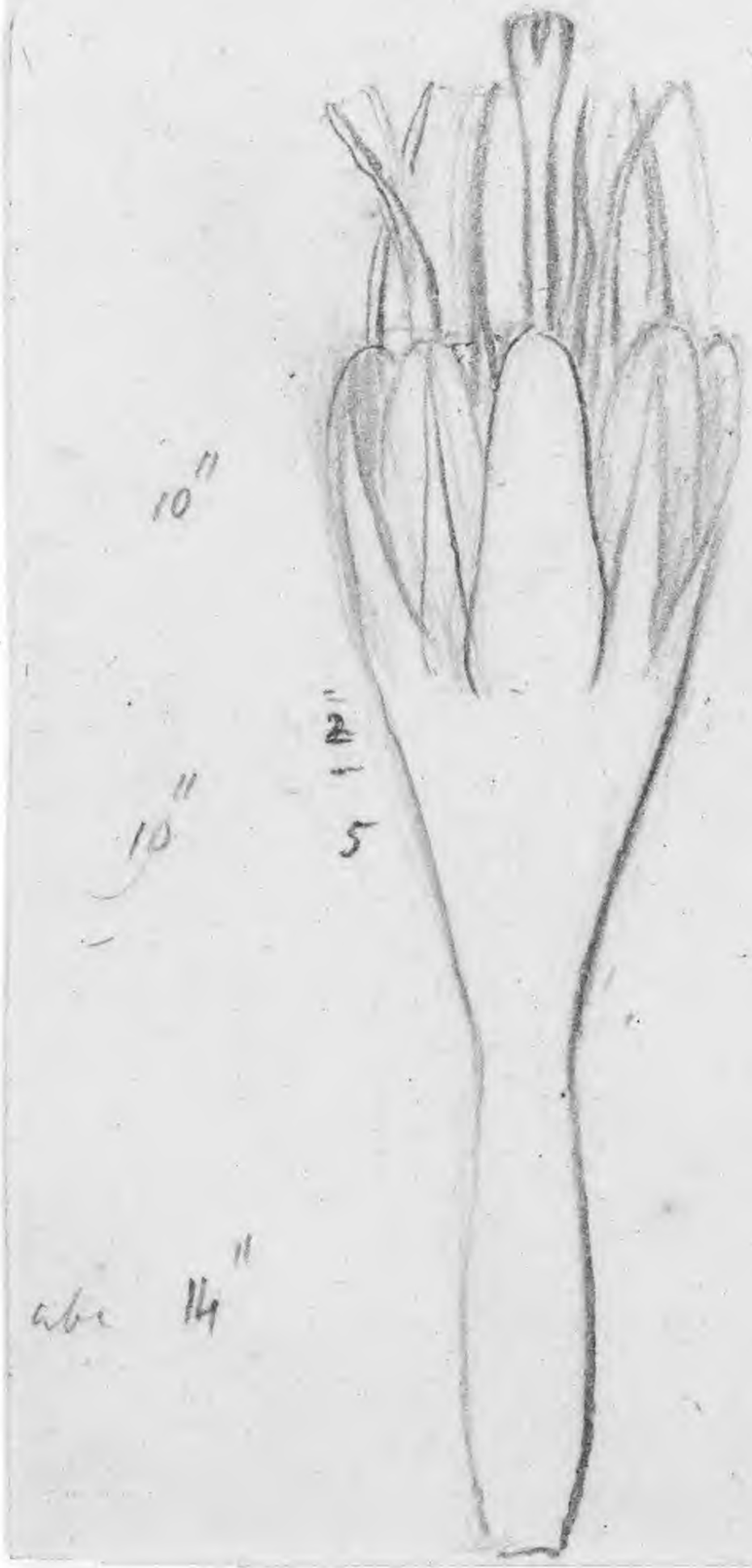


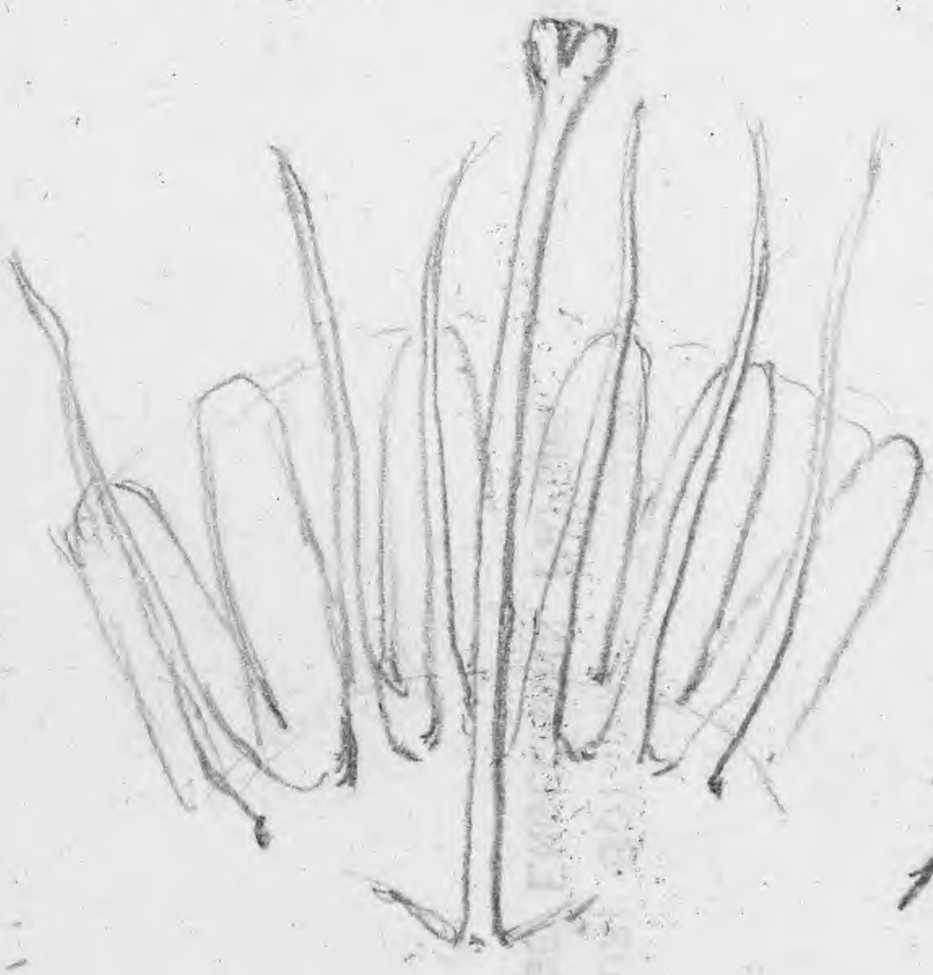
Agave Shawii

Nov 14 1895

Dr E Palmer Coy

old dry flowers soaked



filaments 1½"
inserted 2"
below face
exact above perig.
Tov 8 blue

tube about ½" 10" wide
long

inside of tube 7–8"

filaments with broad
base 2" below face

0 1 2 3 4 5 6 7 8 9 10
cm
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# Alex. Leitch,

## APOTHECARY & CHEMIST,

Cor. 4th & Olive Sts., St. Louis.

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0 1 2 3 4 5 6 7 8 9 10 cm
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Agave Shawii

Dec 1875

Pollen x 415



36x28
415

anther 14½ Diam Long

Agave Shawii

Nov 16 1875

immature fruit. & Palmer 1875



2½" long
11" wide

x4

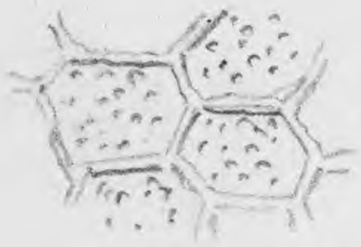






surface x 150

area flat
distinctly pitted -
punctulate



x300

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L. O. WOODRUFF,

**Druggist,**

Cor. Sixth St. & Washington Ave,

Opposite Lindell Hotel, ST. LOUIS, MO.

**HOELKE BROS.,**

APOTHECARIES AND CHEMISTS,

**S. W. Cor. Sixth & Market Sts.,**

ST LOUIS, MO.

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1218

0 cm 1 2 3 4 5 6 7 8 9 10
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anthers 14 "  A. Sharsmith Nov 27 '75

style 8-11 " Corolla tube

fr. ovary 4-6 " " " perigonlobe

Style lobes 12-14 " 33-37 Style

(Tube incl. 6) 26

ovules 389 "

whole perigon ~~11-16 " 20~~

ovules 22-23

ovary prog. 16-18

& ovules

fr. ovary + pedicel

of Tube 3 alt. bases

3 lobes fony

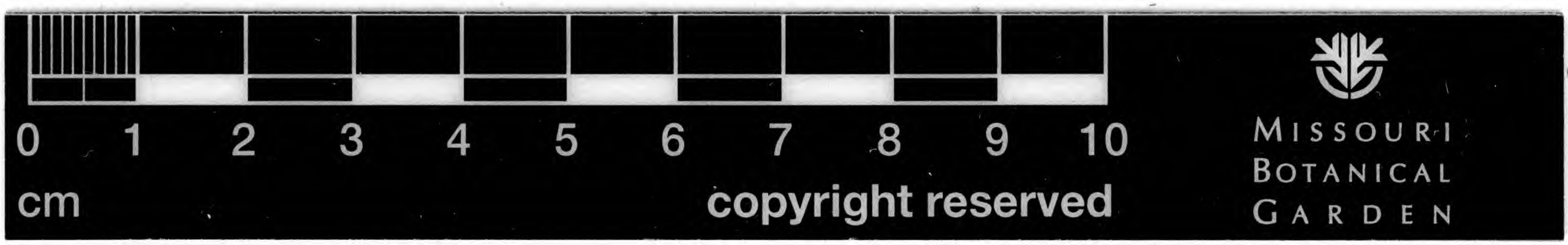
whole tube 9 "

lobes 13-14

perig. 22-23 "

ovy. 16-18

flower 38-41 "



8172

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Sept 11, 16, Colorado

Antheny 4 111

? Flowers only 4 mm long
all 20 mm (now!)

Calyx 4

20 mm

35 mm

perigon tube outside from
Carpels free 9 mm
to where 6 mm exerted
inside

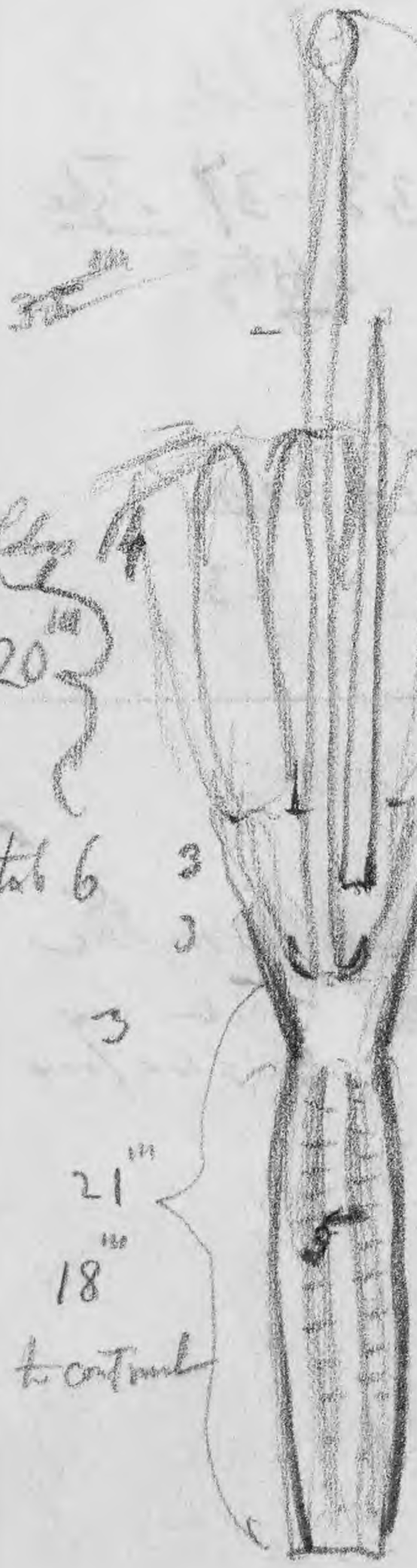
tube 6 3 3 6
3 3 9
3

to base of tube
to constrict 18 3 21

ovary
5 mm diam

21 mm

18 mm
to constrict



0 1 2 3 4 5 6 7 8 9 10
cm
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Agave Shawii
J. N. Hitchcock, San Diego Cal
Nov 28th 1875
Nov 14 1875

internal lob
ext
ext
exter
ext
int
int

Sections on next page
1
2
3
4
5
6

bud just opening
inflated filaments
opening anthers
exsert style

empty
ovules

scales of bud

interior lobe
exterior lobe of perigon
×4

Pollen in Glycerin
×415
Dec 2 1875
26 × 29 / 415
33 × 38 / 415
0.07 – 0.09 mm
small
Pollen in water
37–48 / 415
0.09 – 0.11 mm

0 1 2 3 4 5 6 7 8 9 10
cm
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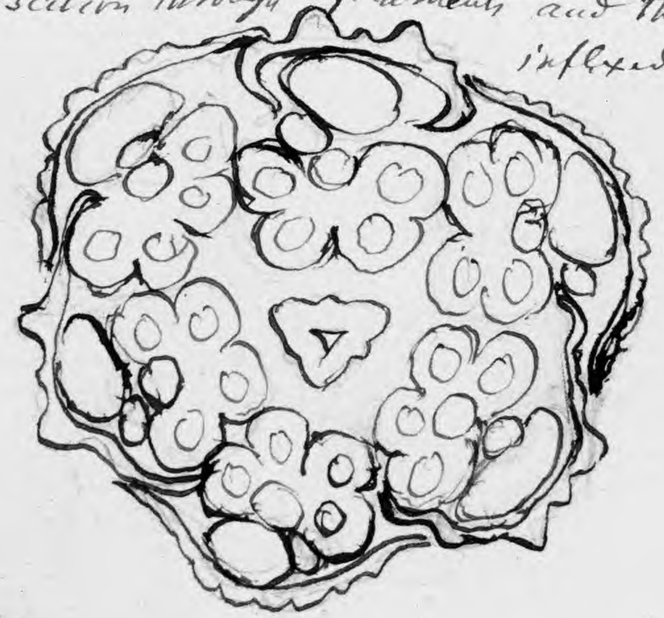
Corner Fifth and Market Streets, St. Louis, Mo.

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X4 Agave Shawii. Nov 28 1875

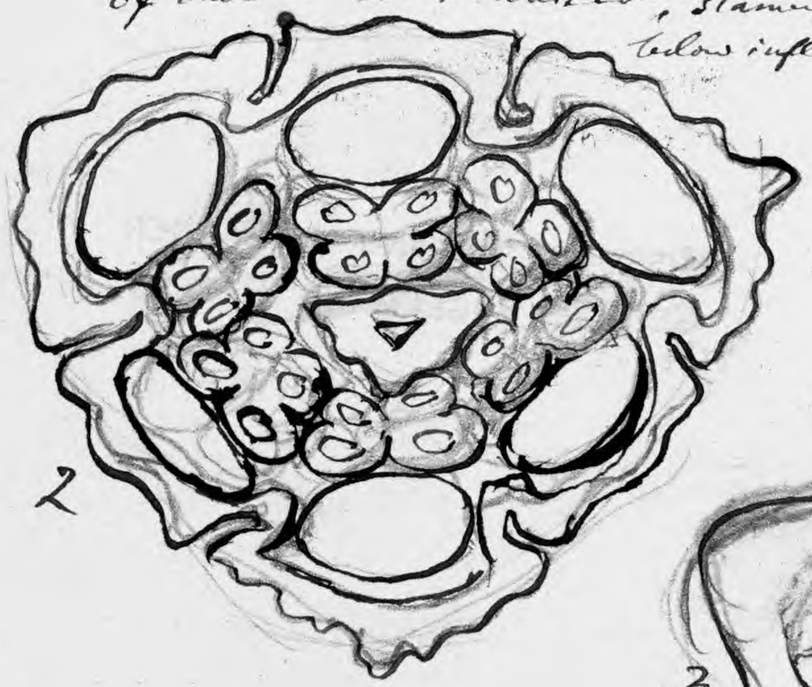
sections through a full grown bud X4

section of bud in upper third of perig— extern Cobes 3‴ intern 2‴ outside section through filaments and their inflexed tips.



1

section of bud in middle of perig— upper end of tube — Cobes united, stamens below inflection

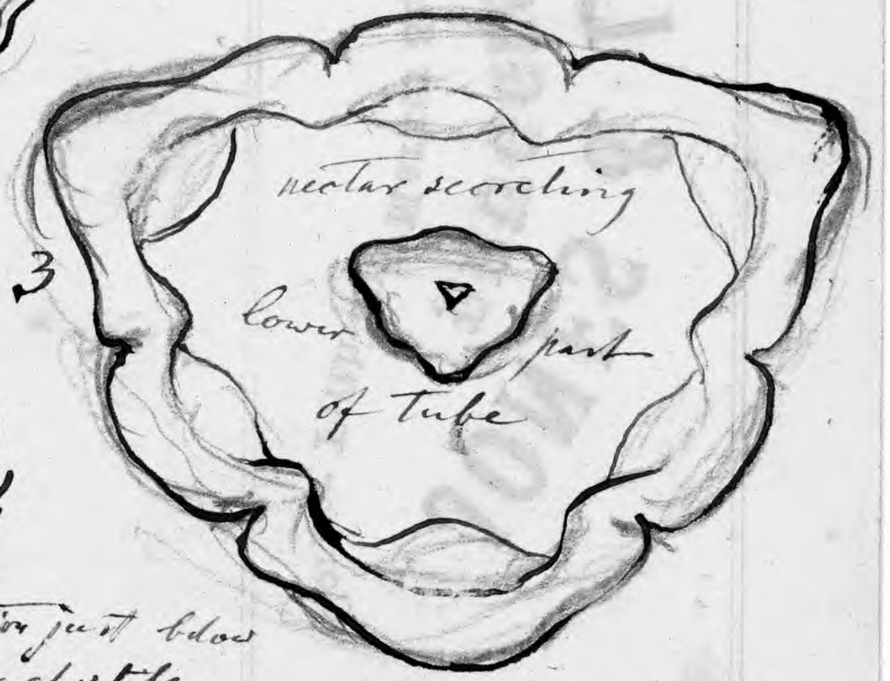


2



sect through stigma

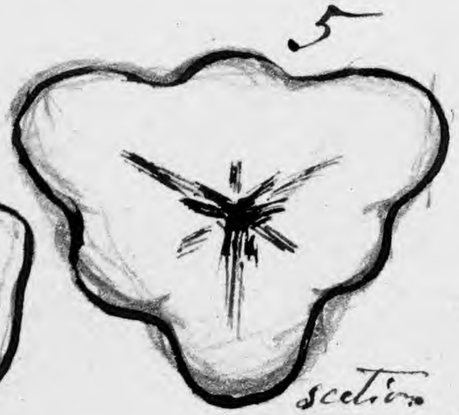
Section of bud lower end of tube, attached part of filaments visible




3

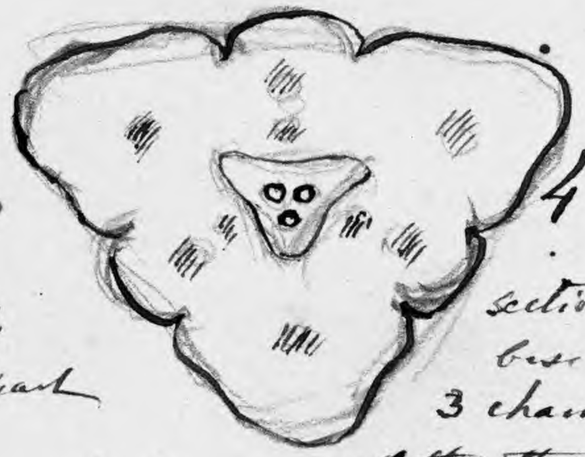
6 section through centre of ovary





section Through neck or narrowest part

5



4

section just below base of style.

3 channels open — place of one, above

all the other lines and marks are only differences of colour in tissue.

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Agave shawii
San Diego

Nov 29 1875

8‴ style longer than fl. tube

anthers 14‴

6‴ ex sort part of fl. tube

13‴ lobes

1 8½‴ Tube

4‴

ovary 15‴–21‴

×4

2¾ inch long
11 lines diam

pentagon 21

ovary 16–21

flower 37–42

fresh pollen, long ÷ water 0.09–0.12 mm

short ÷ Glyc. 0.09–0.10

long ÷ Glyc. 0.08–0.095

×150

surface of seed

×300

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| Febr. | covering 5 | 6 | 7 | R | 9 |
|---|---|---|---|---|---|
| 17th | 1st day same | anther just openg | just openg | just opening | fully open |
| | fil 12" long ess fil style 6" long Corolla | style 12" long the corolla | 15-16" long the corolla | | as long as filament |
| 18th | 2d | style 7" long the fil 25" " " lobes | 4" long the fil | same | 8" long the fil |
| 19th | 3d 6" long | style 12" long the fil stigma opening last day | 12" long just closed filaments withering | same | 12" long the fil |
| 20th | 4th full of liqd style 19" long the fil 26" long the corolla | full of liqd | some liqd style 21" long the corolla | liqd | large drop of liqd |
| 21st | 5th style | drying up | full of liqd | drying | dry |

1st day bud opens through the day — & the corolla & filament have attained their full length, about 1/3 inch longer than corolla lobes; these begin to wither; anthers partially & through the night entirely open; style & length between corolla lobes and of plants;

2d — anthers begin to wither, still retaining a great deal of pollen. style 1/2 - 2/3 inches longer than filament, 2" long than corolla,

3d — plants begin to wither, anthers shriveled & style still length about 1 inch longer than plants — 2/2 above corolla stigma (yet closed, or) & ovary begin to open, but is dry.

4th style has attained its full length 4 1/4 = 4 3/4 inches, 2/2 - 3" above the corolla if strained; stigma with shriveled corolla — large drop of glistening liquid or oily — partially pulverulent — which remains full 24 hours

5th ~~all~~ the junctions stigma dry; ovary dry

flower withering.

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Agave. } near Judial point of Boundary line on the
Coast 20 miles South of San Diego —
Euryphylla no Date. probably summer of 1850
(Dr Torry, Aug 1871)

Flower stem 8 - 12 ft. high; circumference (at base) 8. inch
growing out of the apex of prolonged clusters of leaves
tapering towards the middle. club shaped above &
below. Surface of stem purplish green nearly
covered with broad triangular scales inserted in
the stem obliquely and in a spiral. podose at base
clasping the stem. 6 inch long. 4 in broad at their
insertion — Leaves spatulate acuminate, widening
at their base 18 inch long. 4 1/2 inch at the widest
upper part, with a distinct cartilaginous rim
set with horizontal & hooked bristles (spines?) and
terminating in a sharp acumination. color of leaves
light green marked with the impressions of the
hooks of the folded leaves on the margin. spines
purplish, yellowish white at top. The apex of the
growing leaves prolonging till they become horizontally
prostrate. Upper part of stem thickening to the
lower flower branches. flowering branches horizontally
flattened and subtended with a large leafy bract
bearing flowers in a close cluster at the extremity of
branches having no distinct pedicels. middle & lower
The longest, forming a roundish head [panicle] — fruit oblong

8177

Agave

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July 24 1875 125

[This folder contains sheets 126-139]

Agave Shawii Shawiana

Kearton's

viridis, foliis ovato-lanceolatis supra basin latam vix contractis sursum abrupte acuminatis in spinam robustam teretem (pollicarem) excurrentibus, margine medium versus ± plano exarato-canaliculatum [in folii margine (dimorphi solut. aculeigero) versus ad basin simplici decurrentem], aculeis lateralibus approximatis subæqualibus contiguis latis longis, plerumque sursum curvatis cum margine fusco sicco demum a folio ipso solutis

About the monument on a mesa (at the initial point of the United States Mex Boundary 20 miles south of San Diego Cal

Dr Parry 1852, redrawn by J. M. Hitchcock 1875

Leaves before me 7, rather long 2½ wide fresh green (not glaucous at all) — Terminal spine deep brown about 1 inch long; channeled by the horny brown margin of leaf which runs down from the terminal spine nearly to the base of the leaf — [and seems at last to have detached with the spines] and bears the very long (in the middle of the leaf 5 lines long) broad, flat upward curved crowded spines; base itself scarcely undulate above, entire below

Dr Parry writes March 25 1875: The Agave grew on the Mesa just east of the Monument on the Boundary line [on the coast, 20 miles south of San Diego

July 27 Received full grown leaves with the spine and without the broader base (which is wanting and may be 1½-2 inches long) 6½-7 inches in length and without the marginal spines 3-3¼ inches wide, with the spines nearly 4 inches wide — terminal spine 11-12 lines long.

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Carpel lateral suture 6-8 l. long at last 5 mm. from 6 lines
wide at base - mostly curved upward, sometimes in
opposite direction

Leaf concave above convex below, very thick 1 g lines
and bluntly carinate in lower ½

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Scape
panicle 22" long, 24" wide
about 18 branches — lowest longest 10" S shaped [illegible] horizontal

St Louis Feb 1877

Dimensions.

pedicel 2"'
ovary proper 1½"' neck 6½"' together to base of style 21"'
4"' thick
perianth
corolla above base of style tube 11"', lobes 10-11= 21-22"'
width at opening of tube 7"'
filaments 30-37"' of which 14-15"' are exsert above corolla
insertion of base of filaments 6"' above base of tube;
5"' below base of lobes;
anthers 12-13"' long
style when fully developed 52-58"', of which 22"' is the
corolla, 30-36 above corolla exsert
12-16"' longer than filaments

---

Life history of flower.

17
1st day bud bursts at tip in morning or through the day
in the evening the filaments are stretched out, elongated, 14-16"' above corolla lobes
anthers open at upper
then at lower end, and at last entirely; style is now ½ inch shorter than
filaments and ¾ inch longer than corolla lobes; these latter already begin to wither at
tips.
Tube contains more or less liquid.

16
2d day. Anthers shriveled, but retain quantities of pollen adhering. Style in the morning
still shorter than filaments, exceeds them in evening, say 4"' stigma two lobes
entirely closed

19
3d day style a little longer, stigma [illegible] closed; ~~The 2 inch long the corolla~~

20
4th day style 2 inches long the corolla stigma lobes begin to open, in the evening getting moist.
filaments begin to wither; corolla lobes withered & wilted

21st
5th day style 27"' longer the Corolla, stigma with large drop of glutinous fluid exuded.
plant withering, pendulous; anthers dry, shriveled

Jan 17th The tube of the flower is brimful of a sweet, slightly nauseous, liquid.

The lower branches of panicle open first, but the central flowers of each cluster bloom before the others; all the others follow in quick succession, so that each cluster seems to develope and fade almost simultaneously.

When the anthers open, the style is a little shorter than filaments though exceeding the corolla.

Anthers open at both ends first, and later in the middle

Tip of corolla-lobes begin to fade as soon as fl opens

ovary 1-12-14½ long, neck 6½''' = 19-21'''

corolla above ovary 22'''
Depth of flower 22 lines

Tube 10-11''' lobes 10-11''', erect

filaments from base to tip 2¾'' = 83'''
tube inside 7''' wide
insert 6''' above base 5''' below open of tube
whole filament above corolla-lobes 18'''
anthers 12-13 lines long

style when fully developed, 2¾ inches above corolla.

Whole length from base 4½ inch

outer lobes at base 4''', inward tip 2''' wide, hairy at recurved tip, outer more than inner one

style above coroll 33
corolla 22
ovary x neck 21
} 76'''

ovary & neck 4 1¾ = 21 } 15''' = 6¼''

whole length of style 4½ = 54'''

Style above corolla 33'''
anthers 12-13'''
filaments exsert 18- 19'''
corolla Tube 11 Lobes 11 = 22
ovary proper 14½ neck 6½ = 21'''
whole length of style 19+33 = 52'''
ovary to tip of style

some dist. visible

by actual measurement 6¼''' - 6¼''

# Agave Shawii

sent from San Diego in May 1876.

shot up a flowering stem August 1876

Early in January (4th) 1877 the lower branches of the panicle broke thro the bracts, leading them down, while the upper part formed a large cone of bracts, enclosing the upper branches of the panicle.



Began to flower about the fifth of February.

Today, Febr. 17th 1877. I took off 12 flowers and buds 9 P.M.

1. 3½ inches long, but yet fully closed 18th 9 A.M. same 9. P.M. same 19th 10 A.M. same 20th 9 A.M. just begin to burst. 21st 9 A.M. style a little short the (writing anthers) filaments 9 P.M. style & filaments equally long - 9-10" Began the coroll. 23

2. 3 inches long, fully closed 18th 9 A.M. same 9 P.M. just begin to burst 19th 10 A.M. same 20th 9 A.M. filaments yet undeveloped but anthers partly open. style shorter than anthers 21st 9 A.M style a little long than filaments, anthers writhing 9 P.M style 5" Long the fil, 14" Long the pt.

3. ¾ inch long just opening at tip, protruding the tips of a few anthers 18th 9 A.M. All anthers protruding 6-7 lines, fil. bent. 9 P.M. Anthers long & to open, filaments 6-7" exert, style ¾" above petals 19th 10 A.M anthers shrivelling, fil. 9-10" exert 20th 9 A.M. Style longer than anthers 21st 9 A.M. style 10" Long the filaments, stig closed, & evenly petals wilt by 22nd A.M. Large drop on stig

4, ¾" long, like last, one anther a little more protruding - 18th 9 A.M. Anthers protrudg, style as long as petals, filament straight. 9 P.M. anthers partly open, 2 yet enclosed & filaments bent, style 5" exert, longest filaments 10" exert - 19th 10 A.M. yet each anthers shrivelly - one yet closed! style not grown 20th 9 A.M. style as long as Anthers, stig dry 21st stig begins to open style 7" Long the anth & evenly with drop of liquid AM 22. & 23rd Large drop of liquid

5, ¾" long All anthers protruding, but filament yet bent. style as long as petals - 18th 9 A.M. filaments straight, 5 lines exsert, style 1½ lines exsert. 9 P.M. Anthers partly open, fil about 1" style ½ inch exsert, style 6" above petals 19th 10 A.M. Anth shrivelly, fil 1" style 10 lines above petals 20th 9 A.M style 9" Long the filament - style dry & evenly dry yet 21st 10 A.M style 9" Long the anth, stig just getting moist; & evenly large drop of liquid, style 12" Long the fil, 26" long the corolla opening

6. ¾" long. filaments 1¼" exceeding petals, style exceeding petals 1 inch, anthers 12-13" long just opening - 18th 9 A.M. style as long as filaments 14" exsert anthers shrivelling 9 P.M anthers shrivelly & style 7" Longer than filament (stig closed) 25 Long the lobes (Inserted as in the following one) 19th 10 A.M. style 11" Long the filaments stig opening, but dry 20th 9 A.M. stig & opening but dry 20. 10 p.m. stig full of liquid 21st AM same; & evenly drying up. Tips of petals withering

7. ¾" l. filaments 1¼-1⅓" exceeding petals, style ½ inch shorter than filaments (¾" longer than petals) Anthers just opening. - 18th 9 A.M. same as last. style shorter than fil. 9 P.M. style 4" Long the fil, stig closed 19th 10 A.M stig yet closed no change 20th 9 A.M. stig open but dry filaments long & with 10 p.m. stig with some liquid 21st full of liquid, style 1" Long the fil 27" Long the corolla

8 same as last stigmatic slits still closed and dry, though pollen is adhering to papillae 18th 9 A.M same as last 9 P.M exactly same as last 19th 10 A.M. stig - closed 20th 9 A.M. stig open but dry & fil beginning to wilt, & evenly some liquid on stig 21st evenly closed drying up

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9 pl. 3/4" pistil 1/2" longer anthers fully open, style as long as pistil
stigma as in last — 18th 9 AM. no change 9 PM same, style 8" longer than fil
19th 10 AM. stig — just opening and some pollen expended; style 12" longer than fil
20th 9 AM. stig — with drop of fluid 21st stig as in every Dry

10. pl 3/4" pistil 1/2 long anthers (effete, though) not shrivelled yet some pollen yet adhering
style 1/4" longer than fil.; lobes of stigma yet closed. 18th 9 AM. no change
9 PM. style 11" longer than fil stig closed. 19th 10 AM stig just opening, moist. Fly a little egg
20th 9 AM large drop of liquid 21st still moist & moving, & every Dry

11 like last, but style 1/4-3/4" longer than fil. exceeding the corolla lobes 2/4"
18th 9 AM. style a little longer no other change, petals rolled & twisted & withered at tip
anthers yet straight 9 PM style 12" longer than filaments, 2/4" longer than withered petals
stigma open, exuding liquid since afternoon. 19th 10 A.M. large drop of liquor on stig
plant with becoming flaccid 20th 9 AM still large drop of liquid on stig — plant withered
evening caps to Dry 21st stig Dry but open

12 pl. 3/4" pistil and anthers shrivelled; lobes of corolla
partly withered & rolled in & twisted; style exceeding the
corolla 2 3/4 inches, stigma slits open and exuding liquid,
a large drop of which covers the entire surface
18th 9 AM. no change; stigma liquid drying up 9 P.M. no change, only filaments & lobes
more withered yet; stig — dry-ish; but not closed

As last all parts with the exception of the ovary withered,
style recurved — twisted, flowers which had been greenish
to pale sulphur now become deep dirty yellow ~~or even dirty orange~~.

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Agave Shawii

San Diego & Palm

Nov 16 878




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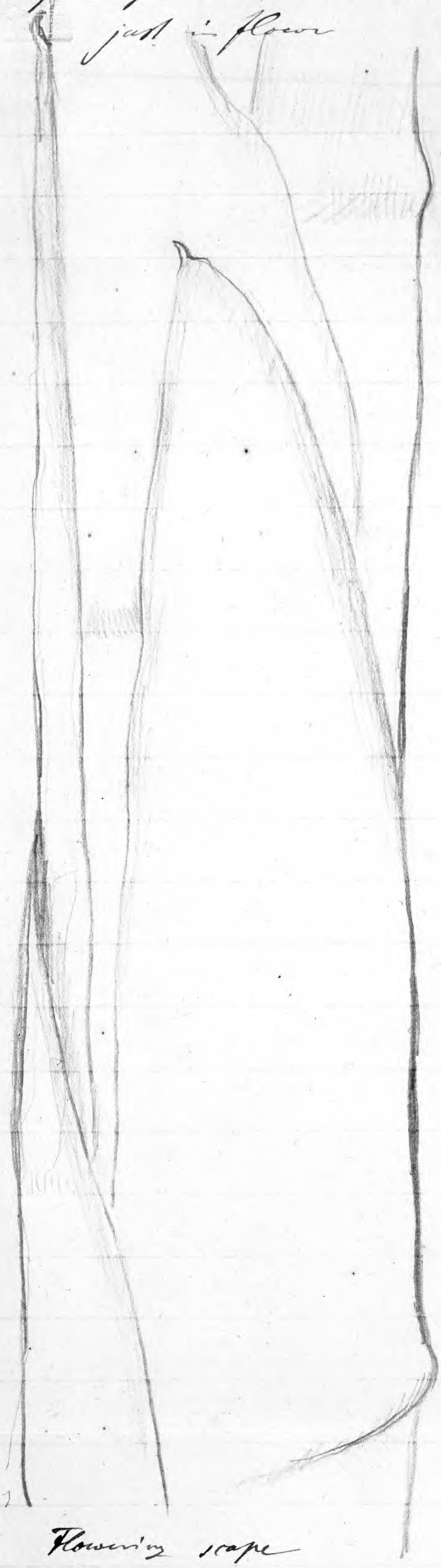
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St Louis Nov. 29 1875

Agave Shawii

San Diego G. N. Hitchcock Nov 14 '75

just in flower



Flowering scape

3/5 order

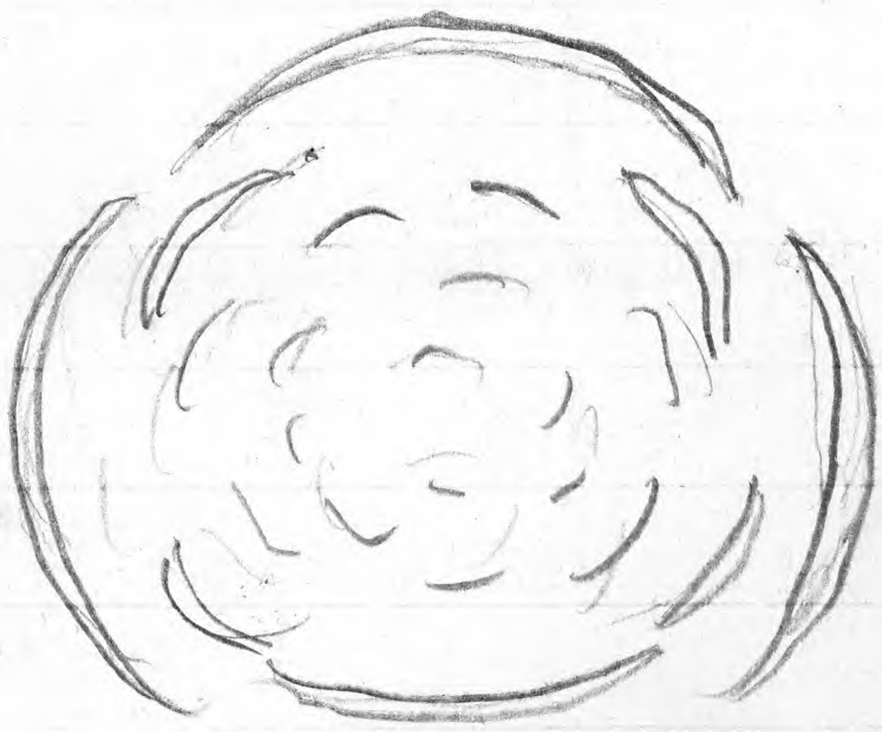


Crests grain
& fleshy

Surrounding very compact mass of about 50 flowers interspersed with small bracts, inner most filiform, 1–2 inches long

flowers fallen off only the thick pedicells visible 3–4 lines thick about 50 in number

Flowering branch



Crests of flowers at the top of flowering branch

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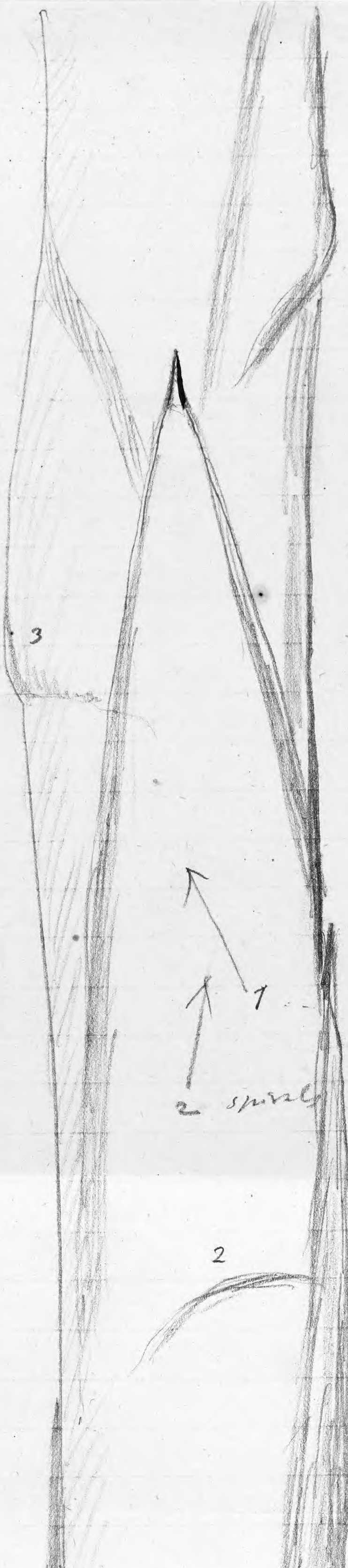
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Nov 16 1875

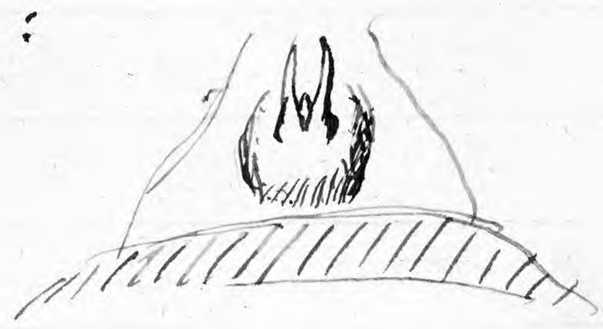
Agave Shawii
Dr Palmer 1875




bracts on this piece in 2/5 phyllotaxis arrangement large (3–6 inches) foliage sharp pointed, with brown exfoliating, not ripply original spine margin. ~~really~~ imbricated closely adpressed.

lower ones with an aborting ax. Many bud as figured here:



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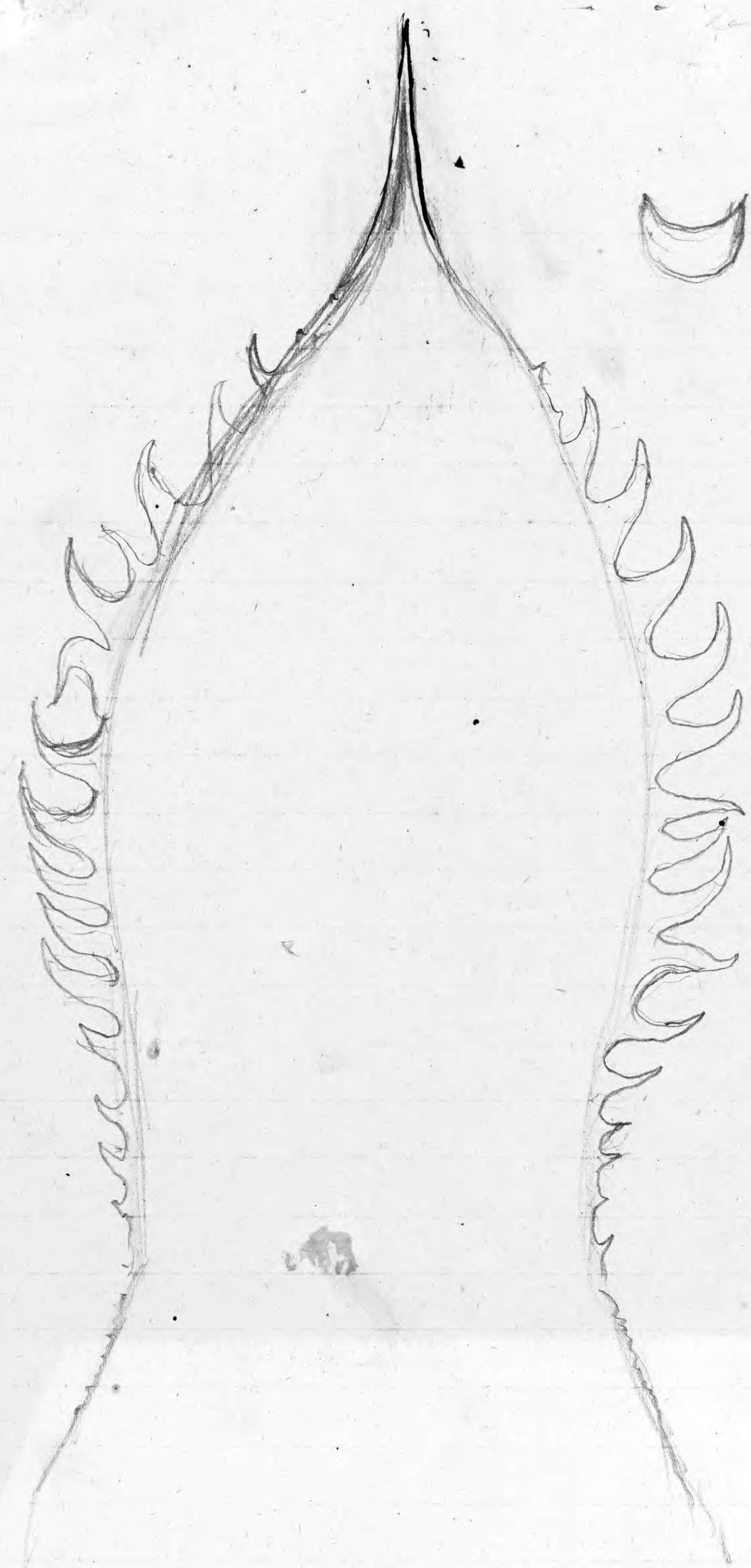
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Leaf and Cross Section
Aug 24 1875



Section of Base of spine



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